

What we claims:

1 1. A storage subsystem which is connected to a host
2 computer through a communication line, comprising
3 an interface which is used for connecting to said
4 communication line, wherein,
5 said interface comprises a first filter which judges,
6 on the occasion of having received communication packets
7 from said communication line, whether there is a
8 communication packet with a predetermined format for use
9 in an access to said storage subsystem, among the
10 communication packets.

1 2. The storage subsystem according to Claim 1,
2 wherein,
3 said interface further comprises a second filter which
4 receives the communication packet judged to be for said access
5 in said first filter, and judges whether it is a communication
6 packet permitted to access to a storage area in said storage
7 subsystem and transmitted from said host computer or not.

1 3. The storage subsystem according to Claim 2,
2 wherein,
3 in case that said host computer is permitted to access
4 to said storage subsystem, said interface further comprises
5 an access permission table having information which uniquely

6 specifies the host computer, and information which specifies
7 a storage area in said storage subsystem to which the host
8 computer is permitted to access, and
9 said second filter judges whether a communication
10 packet judged to be for use in said access is transmitted
11 from the host computer permitted to access or not, in
12 accordance with information stored in said access permission
13 table.

1 4. The storage subsystem according to Claim 1,
2 wherein,
3 said interface further comprises
4 a traffic measuring and judging unit which measures
5 traffic of all communication packets received in the
6 interface, and traffic of a communication packet judged not
7 to be the packet with said format in said first filter,
8 respectively, and by using the both traffics, judges whether
9 a communication failure is generated or not, and
10 a communication failure alerting unit which alerts a
11 management server connected to said storage subsystem and
12 comprises a function of displaying information alerted, in
13 case that it is judged that a communication failure is
14 generated in said traffic measuring and judging unit.

1 5. The storage subsystem according to Claim 4,
2 wherein,

3 said traffic measuring and judging unit further
4 measures traffic of a communication packet judged not to
5 be the communication packet transmitted from said host
6 computer which is permitted to access in said second filter,
7 and by using the traffic and said traffic of all communication
8 packets, further judges whether a communication failure is
9 generated or not.

1 6. The storage subsystem according to Claim 5,
2 wherein,

3 said interface further comprises
4 a traffic log recording unit which records, as a traffic
5 log, communication information of a communication packet
6 judged not to be the communication packet with said format
7 in said first filter and a communication packet judged not
8 to be the communication packet transmitted from said host
9 computer permitted to access in the second filter.

1 7. A management server connected to the storage
2 subsystem according to Claim 6, wherein,

3 an improper communication source analyzing unit which
4 refers to said traffic log, in case that it is alerted from
5 a communication failure alerting unit of said storage
6 subsystem that a communication failure is generated, and
7 searches a source of said communication packet causes the
8 communication failure.

1 8. The management server according to Claim 7, further
2 comprising,
3 a relay device control unit which controls, based on
4 information of a source searched in said improper
5 communication source analyzing unit, a relay device which
6 relays communication to said storage subsystem disposed on
7 said communication line so as to cut off communication from
8 the source.

1 9. A program in a computer mounted on a storage
2 subsystem connected to a host computer through a
3 communication line, functioned as
4 interface means which connects to said communication
5 line, and
6 first filtering means which judges, on the occasion
7 of having received communication packets from said
8 communication line through said interface means, whether
9 there is a communication packet with a predetermined format
10 for use in an access to said storage subsystem, among the
11 communication packets.

1 10. A program according to claim 9, further functioned
2 as
3 second filtering means which receives the
4 communication packet judged to be for said access in said
5 first filtering means, and judges whether it is a communication

6 packet permitted to access to a storage area in said storage
7 subsystem and transmitted from said host computer or not.

1 11. A program according to claim 9, further functioned
2 as

3 communication failure judging means which measures
4 traffic of all communication packets received in said
5 interface means, and traffic of a communication packet judged
6 not to be the packet with said format in said first filter,
7 respectively, and by using the both traffics, judges whether
8 a communication failure is generated or not, and

9 a communication failure alerting means which alerts
10 a management server connected to said storage subsystem and
11 comprises a function of displaying information alerted, in
12 case that it is judged that a communication failure is
13 generated in said communication failure judging means.

1 12. A program in a computer mounted on a management
2 server which is connected to a storage subsystem, functioned
3 as

4 source searching means which refers to said traffic
5 log, in case that it is alerted from a communication failure
6 alerting unit of said storage subsystem that a communication
7 failure is generated, and searches a source of said
8 communication packet which causes the communication failure.

1 13. A program which has a computer, mounted on a
2 management server which is connected to a storage subsystem,
3 functioned as

4 source searching means which refers to said traffic
5 log, in case that it was alerted from a communication failure
6 alerting unit of said storage subsystem that a communication
7 failure is generated, and searches a source of said
8 communication packet which causes the communication failure,
9 and

10 relay device control means which controls, based on
11 information of a source searched in said source searching
12 means, a relay device which relays communication to said
13 storage subsystem disposed on said communication line for
14 receiving a communication packet so as to cut off
15 communication from the source.

1 14. A computer-readable recording medium in which the
2 program according to Claim 9 is recorded.

1 15. A storage system in which a storage subsystem,
2 a host computer, and a management server are connected by
3 a communication line, wherein,

4 said storage subsystem comprises an interface which
5 connects to said communication line, and

6 said interface comprises,

7 a first filter which judges, on the occasion of having

8 received communication packets from said communication line,
9 whether there is a communication packet with a predetermined
10 format for use in an access to said storage subsystem, among
11 the communication packets,

12 a second filter which receives the communication packet
13 judged to be for said access in said first filter, and judges
14 whether it is a communication packet permitted to access
15 to a storage area in said storage subsystem and transmitted
16 from said host computer or not,

17 a traffic measuring and judging unit which measures
18 traffic of all communication packets received in the
19 interface, and traffic of a communication packet judged not
20 to be the packet with said format, respectively, and by using
21 the both traffics, judges whether a communication failure
22 is generated or not,

23 a communication failure alerting unit which alerts said
24 management server, in case that it is judged that a
25 communication failure is generated in said traffic measuring
26 and judging unit, and

27 a traffic log recording unit which records, as a traffic
28 log, communication information of a communication packet
29 judged not to be the communication packet with said format
30 in said first filter and a communication packet judged not
31 to be the communication packet transmitted from said host
32 computer permitted to access in the second filter, and

33 said management server comprises

34 a display device which displays the alert received from
35 said communication failure alerting unit,
36 an improper communication source analyzing unit which
37 refers to said traffic log, in case that it is alerted from
38 a communication failure alerting unit of said storage
39 subsystem that a communication failure is generated, and
40 searches a source of said communication packet which causes
41 the communication failure,
42 a relay device control unit which controls, based on
43 information of a source searched in said improper
44 communication source analyzing unit, a relay device which
45 relays communication to said storage subsystem disposed on
46 said communication line so as to cut off communication from
47 the source.

1 16. The storage system according to Claim 15, wherein,
2 in case that said host computer is permitted to access
3 to said storage subsystem, said interface further comprises
4 an access permission table having information which uniquely
5 specifies the host computer, and information which specifies
6 a storage area in said storage subsystem to which the host
7 computer is permitted to access, and
8 said second filter judges whether a communication
9 packet judged to be for use in said access, is transmitted
10 from the host computer permitted to access or not, in
11 accordance with information stored in said access permission

12 table.

1 17. The storage system according to Claim 15, wherein,
2 said traffic measuring and judging unit further
3 measures traffic of a communication packet judged not to
4 be the communication packet transmitted from said host
5 computer permitted to access in said second filter, and by
6 using the traffic and said traffic of all communication
7 packets, further judges whether a communication failure is
8 generated or not.

1 18. The storage system according to Claim 17, wherein,
2 said traffic measuring and judging unit further
3 measures traffic of a communication packet judged to be the
4 communication packet transmitted from said host computer
5 permitted to access in said second filter, and by using the
6 traffic and said traffic of all communication packets, judges
7 whether a value of a ratio of traffic of a communication
8 packet transmitted from said host computer permitted to
9 access to traffic of all communication packets is less than
10 a predetermined value or not, and

11 said communication failure alerting unit alerts said
12 management server of the alert which indicates that second
13 communication failure is generated, in case that it is judged
14 that the value of the ratio is less than the predetermined
15 value in the traffic measuring and judging unit, and

16 said management server further comprises
17 a QoS condition designating unit which, in case of
18 having received the alert which indicates that the second
19 communication failure is generated from said communication
20 failure alerting unit, readjusts a network QoS between said
21 storage subsystem and said host computer, which has been
22 set up in advance by an administrator.

1 19. A communication control method in a storage system
2 in which a storage subsystem, a host computer, and a management
3 server are connected by a communication line, comprising
4 the steps of:

5 judging, when communication packets from said
6 communication line were received in said storage subsystem,
7 whether there is a communication packet with a predetermined
8 format for use in an access to said storage subsystem, among
9 the communication packets,

10 measuring traffic of all communication packets
11 received by said storage subsystem, and traffic of a
12 communication packet judged not to be the packet with said
13 predetermined format, respectively, and recording a traffic
14 log of a communication packet judged not to be the
15 communication packet with said format,

16 judging, by using said measured both traffics, whether
17 a communication failure is generated or not, and alerting
18 said management server, in case that it is judged that a

19 communication failure is generated,
20 referring to said traffic log, in case that the alert
21 that the communication failure is generated is received in
22 said management server from said storage subsystem, and
23 searching information of a source of said communication
24 packet which causes said communication failure, and
25 controlling, based on information of the searched
26 source, a relay device which relays communication to said
27 storage subsystem disposed on said communication line so
28 as to cut off communication from the source.

1 20. A storage system having a storage subsystem
2 connected to a host computer through a communication line,
3 and a management server connected to said storage subsystem,
4 wherein,
5 said storage subsystem comprises
6 an interface which connects to said communication line
7 and a maintenance terminal which maintains said storage
8 subsystem, and
9 said interface comprises
10 a first filter which judges, on the occasion of having
11 received communication packets from said communication line,
12 whether there is a communication packet with a predetermined
13 format for use in an access to said storage subsystem, among
14 the communication packets,
15 a second filter which receives the communication packet

16 judged to be for said access in said first filter, and judges
17 whether it is a communication packet permitted to access
18 to a storage area in said storage subsystem and transmitted
19 from said host computer or not

20 a traffic measuring and judging unit which measures
21 traffic of all communication packets received in the
22 interface, and traffic of a communication packet judged not
23 to be said communication packet permitted to access in said
24 second filter, respectively, and calculates a value of a
25 ratio of the both traffics (communication ratio), and by
26 using the both traffics, judges whether a communication
27 failure is generated or not, and

28 a communication failure alerting unit which alerts said
29 maintenance terminal, in case that it is judged that a
30 communication failure is generated in said traffic measuring
31 and judging unit, of that failure is generated and said
32 communication ratio, and

33 said maintenance terminal comprises

34 a warning message reporting unit which generates, in
35 case that the alert of that a communication failure is
36 generated and said communication ratio is received from said
37 communication information and failure alerting unit, a
38 warning message in accordance with said alert, and outputs
39 it to said management server, and

40 said management server comprises:

41 an output device,

42 a failure information displaying unit which comprises
43 said output device displayed the warning message and said
44 communication ratio received from said warning message
45 reporting unit, and

46 a QoS condition designating unit which judges whether
47 said communication ratio is within a predetermined
48 permissible zone, and in case that it is judged to be outside
49 the permissible zone, adjusts a network QoS of a relay device
50 which relays communication to said storage subsystem
51 disposed on said communication line.